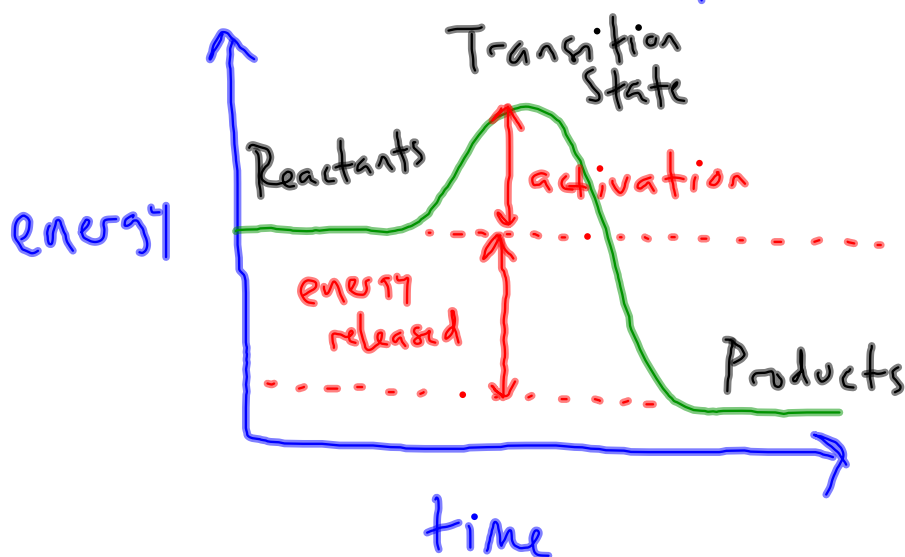


## Chemical Reactions Continued:

- Chemical changes ...
  - Substances change from one thing to another
  - Breaking old bonds and creating new ones
- All chemical reactions involve energy
  - Every time a bond is made or broken, energy is used
  - Breaking bonds requires energy
  - Forming bonds releases energy

- Chemical energy is stored in bonds  $\rightarrow$  the stronger the bond, the more energy it takes to break it
  - Energy is neither created nor destroyed  $\rightarrow$  just transferred
    - Energy within reactions is conserved
    - Energy reactants and activation MUST be the same as energy of products (plus thermal energy)
- activation  $\rightarrow$  whatever energy it takes to make reaction happen

- Heat changes in chemical reactions:
  - Exothermic reaction
    - produce energy, causing a rise in temperature



reactants + activation  $\rightarrow$  products + thermal energy